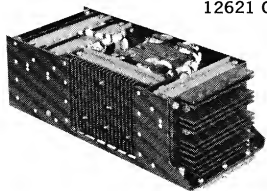


What? A random access,
high-density, welded
core memory with a
wide temperature range
and a 4.5 microsecond
read/write cycle?

Right! It's the SEMS-1R from

electronic memories inc.

12621 Chadron Ave., Hawthorne, Calif.



SEMS-1R
severe environment
memory system

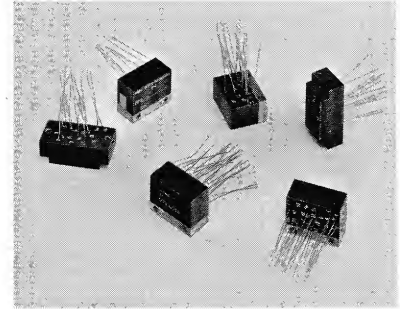
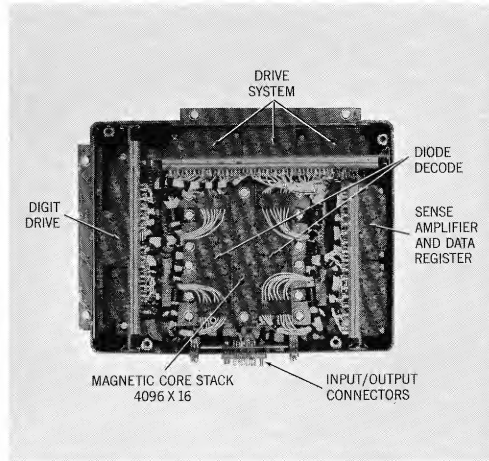
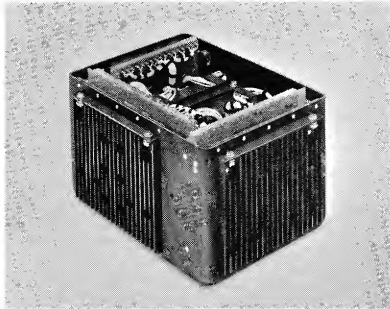
CONCEPT

For the first time: A miniature, severe environment, random access, core memory system that combines the fastest speed yet found for military applications, with the versatility of a wide selection of word and bit sizes. That's EMI's new SEMS-1R.

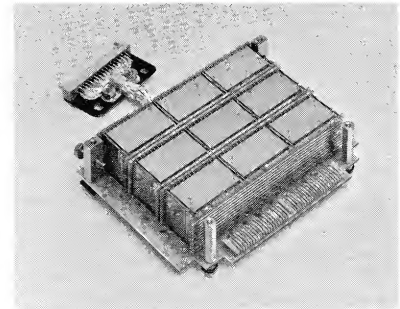
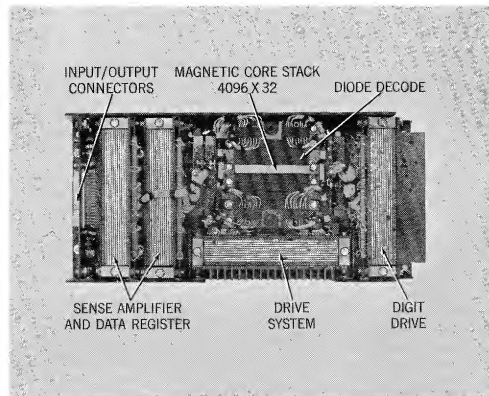
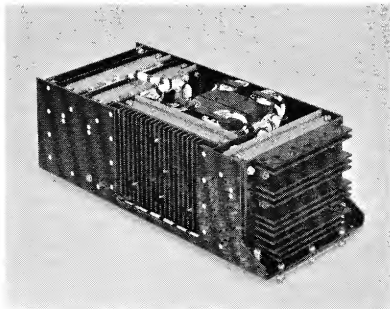
Designed to provide a militarized, high reliability package, while offering economical, random access operation over a wide temperature range, the SEMS-1R utilizes EMI's standardized "Isodrive" memory cores (see page 4), which maintain constant output signals at -55°C to $+100^{\circ}\text{C}$.

You have a choice of two high reliability package configurations:

Welded Package: Utilizes encapsulated, welded modules and welded module interconnections for low weight and volume and a high order of reliability.



Pluggable-Welded Package: Made up of encapsulated, welded modules incorporating plug-in, cordwood construction for simplified maintenance at the module level.

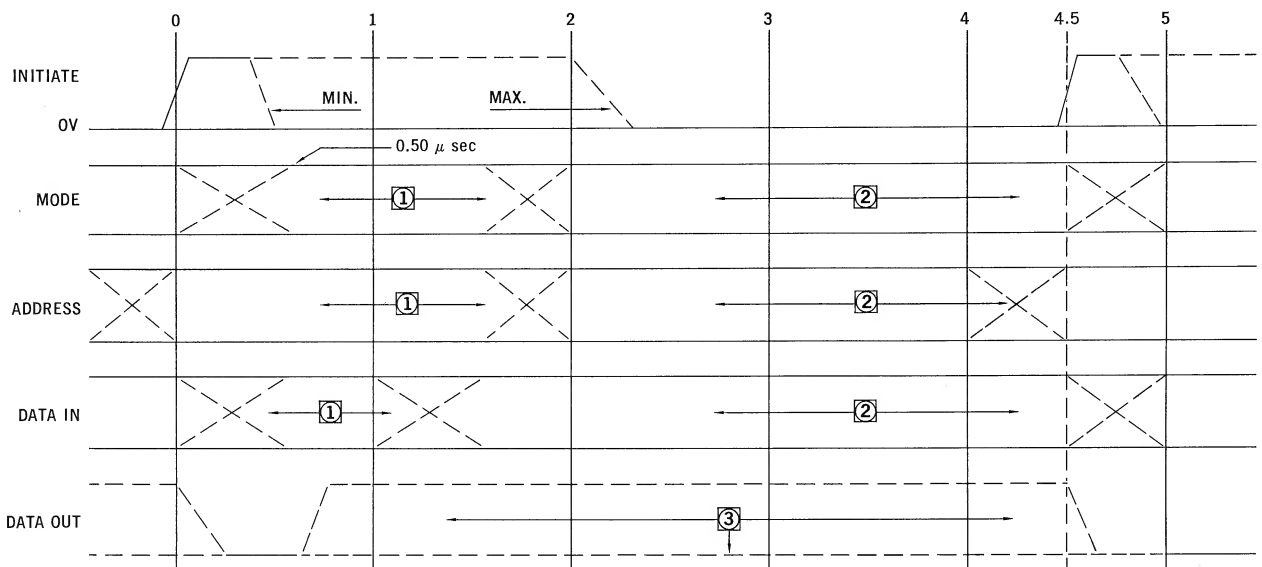


Another plus for SEMS-1R reliability is in the construction of the arrays within the memory unit. Continuous wiring connects all cores and arrays together. There are no soldered, welded, or plugged terminals between memory bits. Once the arrays are strung together, they are simply folded and assembled into a rugged package.

Both are designed to meet the Mil-Spec requirements for ground based, shipboard and airborne applications, where the following factors are of prime importance:

- High reliability
- Low weight and volume
- Minimum power
- High speed

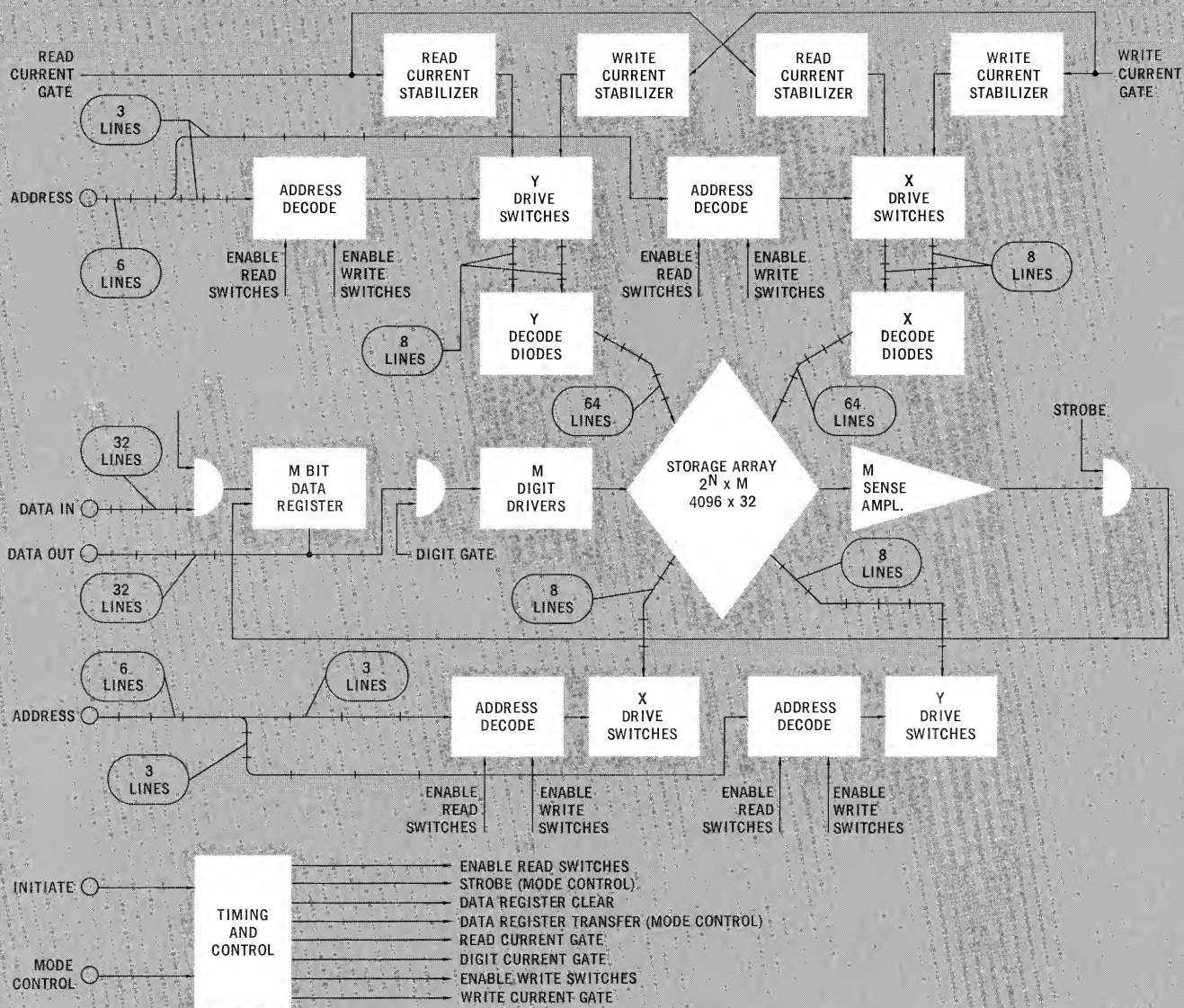
TIME IN MICROSECONDS



① MUST BE SETTLED DURING THIS TIME

② NOT USED DURING THIS TIME

③ OUTPUT DATA AVAILABLE UNTIL NEXT INITIATE PULSE



SPECIFICATIONS

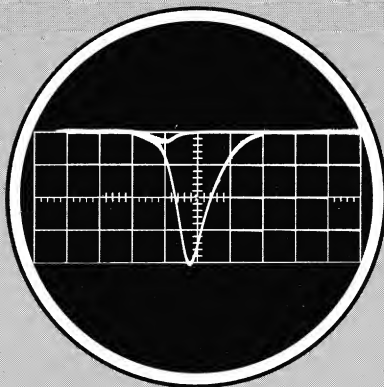
Storage Capacity¹	256, 512, 1024, 2048, or 4096 words by 4 to 32 bits (in 2 bit increments).
Operating Temperature	-55°C to +100°C
Storage Temperature	-65°C to +125°C
Altitude	70,000 ft.; or higher at slightly reduced upper temperature limits.
Read/Restore Cycle Time	4.5 μ sec.
Clear/Write Cycle Time	4.5 μ sec.
Access Time	Less than 1.0 μ sec.
Operating Rate	0 to 220 kc
Input Signal Levels	Binary 0 = 0 to 0.5 V Binary 1 = +4 V to +7 V
Output Signal Levels	Binary 0 = 0 to 0.25 V Binary 1 = +5 V to +6.5 V
Input Currents	
A. Address	3 ma. max. for 1.5 μ sec. if line is in + state; 0 ma if line in 0 state.
B. Mode Control	0.4 ma in 0 state (CLEAR/WRITE), 0 ma when in + state (READ/RESTORE).
C. Information	0 level — no current required. $\pm$ level — less than 1.0 ma.
D. Initiate	0 level — no current required. + level — less than 1.0 ma.
E. Edge Current	In addition to the logic current required, approximately 9.0 ma of edge current must be supplied to charge a capacity of approximately 200 μ mf to effect a change from one logic level to another level within 100 nanoseconds.
Output Current	
Information Lines	0 level — 0 current + level — 5.0 ma.

Input Signal Characteristics	Rise Time (μ sec.)	Width (μ sec.)
A. Address	.1	1.5 min.
B. Initiate	.1	0.2 to 2.0
C. Information Lines	.1	1.0 min.
D. Mode Control	level	level
Output Signal Characteristics		
Information	.1	2.0 min.
Power Req^{mt} (4096 x 32)	35 watts for 4.5 microsecond cycle time.	
Voltages Required²	+15, +6, -3	
Volume (4096 x 32) ²	Without power supply — 330 cubic in. for pluggable-welded package. ³	
Weight (4096 x 32)	Without power supply — 12 lbs.	
Form Factor (4096 x 32) ²	Length 12 3/4"; width 5 7/8"; height 4 1/2". ³	
Applicable Mil Specs	MIL-E-5400, MIL 16400E, MIL 4158B, MIL-Q-9858	
Vibration and Shock	Per applicable mil-spec.	
Types of Packaging	Pluggable welded modules; or, welded modules with welded interconnections.	

1. Larger word and bit sizes available to meet special requirements.
2. Power supply optional — if required, add additional 125 cu. in.
3. Smaller packaging available for special requirements.

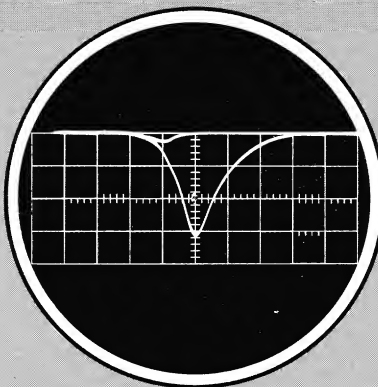
ISODRIVE CORE

Comparative output wave forms

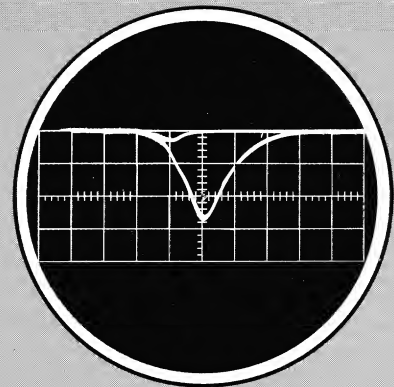


+100° C

Actual test oscillogram with core immersed in boiling water



+25° C ROOM TEMP.



-55° C

Actual test oscillogram, core in dry ice and alcohol.

FEATURES

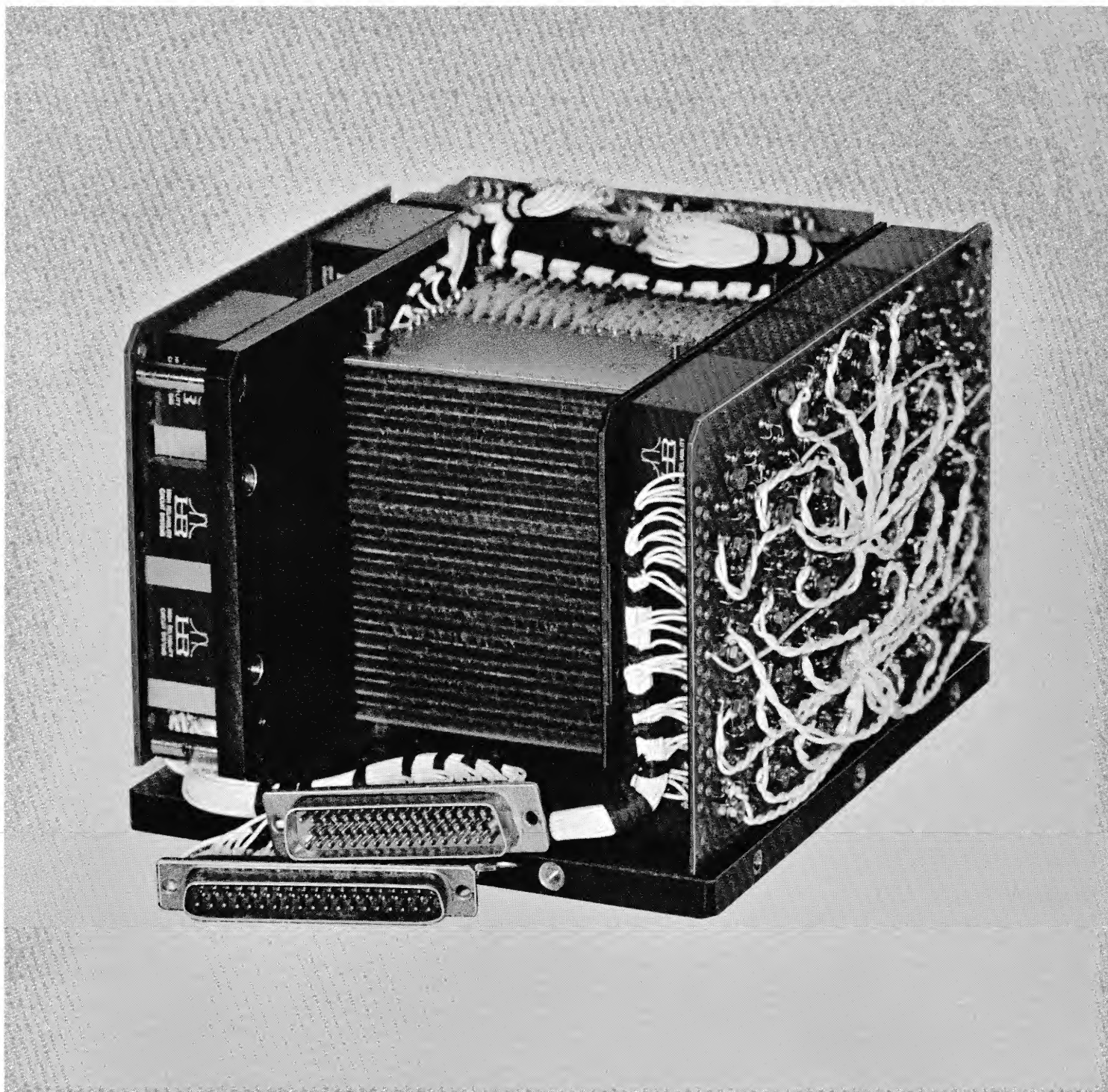
Fast switching, high drive, high output. Improved disturb ratio allowing increased tolerance to drive current drift. Increased signal-to-noise ratio at sampling time. Excellent characteristics over -55°C to +100°C operating range without current compensating circuits.

RECOMMENDED OPERATING CONDITIONS

Temperature	-55°C to +100°C
Drive Pulse ($I_r = I_w$)	700/350 ma turns
Pulse Width (t_w)	1.0 μ s
Pulse Rise Time (t_r)	.2 μ s $\pm$.02 μ s linear
Pulse Fall Time (T_f)	0.2 μ s min.

TYPICAL OUTPUT SIGNALS

Temperature:	-55°C	+25°C	+100°C
Switching time (t_s)	0.62 μ s	0.58 μ s	0.63 μ s
Peaking time (t_p)	0.36 μ s	0.34 μ s	0.30 μ s
Amplitude ONE (μ V1)	44 mv	48 mv	68 mv
Amplitude ZERO (μ Vz)	4 mv	5 mv	5 mv



SEMS-3R AEROSPACE CORE MEMORY SYSTEM

Capacity:	256 to 4096 words / 4 to 28 bits per word
Speed:	4.5 μ sec cycle time
Temperature Range:	-55°C to +100°C or -25°C to +75°C
Size:	4½" x 5¾" x 6¾"
Volume:	175 cubic inches

Meets MIL shock, vibration and humidity specifications

electronic memories inc.

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THE SEMS-3R

Volume: 175 cubic inches.

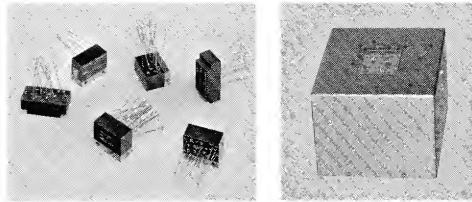
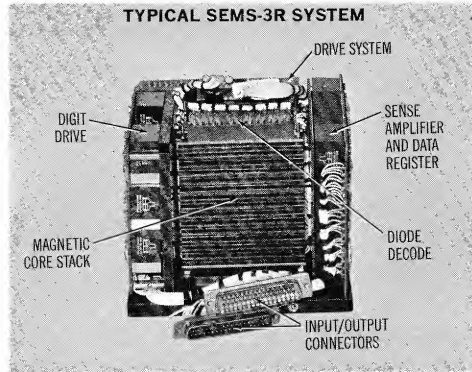
Capacity: 4096 words of 28 bits.

Speed: Access time less than 1.0 micro-seconds; 220,000 Random Memory cycles per second. Cycle time less than 4.5 microseconds.

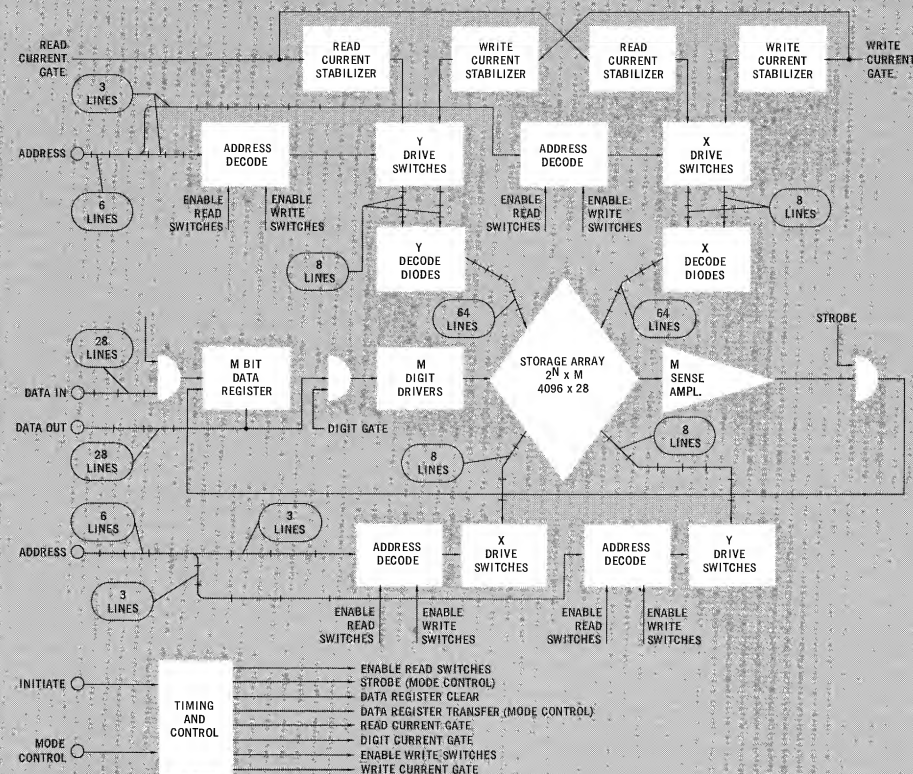
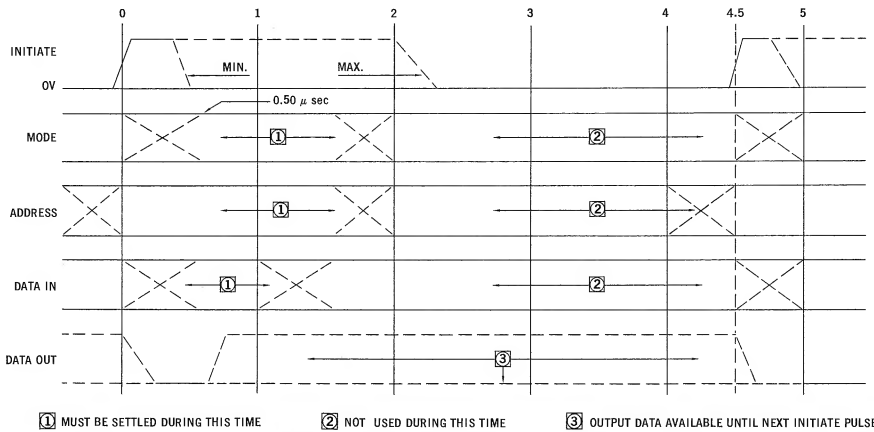
Environments: MIL-E-5400, MIL 16400E, MIL 4158B.

The SEMS-3R allows severe environment control and guidance systems designers to put a fast, rugged, large capacity core memory system into tightly restricted space. The memory system is available in a range of word capacities and bit sizes. The SEMS-3R is available in two operating temperature range versions for maximum applications economy.

The SEMS-3R is designed specifically for airborne, satellite, shipboard and ground based applications where high reliability, low weight and volume, minimum power and high speed are required design criteria.



TIME IN MICROSECONDS



SPECIFICATIONS

Storage Capacity	256, 512, 1024, 2048, or 4096 words by 4 to 28 bits (in 2 bit increments)
Operating Temperature	-55°C to +100°C or -25°C to +75°C
Storage Temperature	-65°C to +125°C
Altitude	70,000 ft., or higher at slightly reduced upper temperature limits
Read/Restore Cycle Time	4.5 μsec.
Clear/Write Cycle Time	4.5 μsec.
Access Time	Less than 1.0 μsec.
Operating Rate	0 to 220 Kc
Input Signal Levels	Binary 0 = 0 to 0.5 V Binary 1 = +4 V to +7 V
Output Signal Levels	Binary 0 = 0 to 0.25 V Binary 1 = +5 V to +6.5 V

Input Currents

- A. Address 3 ma. max. for 1.5 μsec. if line is in + state; 0 ma. if line in 0 state
- B. Mode Control 0.4 ma. in 0 state (CLEAR/WRITE), 0 ma. when in + state (READ/RESTORE)
- C. Information 0 level — no current required
± level — less than 1.0 ma.
- D. Initiate 0 level — no current required
+ level — less than 1.0 ma.
- E. Edge Current In addition to the logic current required, approximately 9.0 ma. of edge current must be supplied to charge a capacity of approximately 200 μμf to effect a change from one logic level to another level within 100 nanoseconds

Output Current

- Information Lines 0 level — 0 current
+ level — 5.0 ma.

Input Signal Characteristics

	Rise Time (μsec.)	Width (μsec.)
A. Address	.1	1.5 min.
B. Initiate	.1	0.2 to 2.0
C. Information Lines	.1	1.0 min.
D. Mode Control	level	level

Output Signal Characteristics

Information	.1	2.0 min.
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Power Req'mt (4096 x 28) 35 watts for 4.5 μsec. cycle time

Voltages Required +15, +6, -3

Volume (4096 x 28) 175 cubic inches

Weight (4096 x 28) 8 lbs.

Form Factor (4096 x 28) Length = 6.75; Width = 5.79; Height = 4.45

Applicable Mil Specs MIL-E-5400, MIL 16400E, MIL 4158B, MIL-Q-9858

Vibration and Shock Per applicable mil spec

Type of Packaging Welded circuit modules and encapsulated magnetics

Word capacities to 8192 and bit length to 56 are available for special requirements.



SEMS-4R CORE MEMORY SYSTEM

Capacity: 256 to 8192 words
6 to 40 bits per word

Speed: 4 μ sec cycle time, 1 μ sec access time

Operating Temperature Ranges: -40°C to $+85^{\circ}\text{C}$
 -20°C to $+65^{\circ}\text{C}$
 0°C to $+50^{\circ}\text{C}$

Size: 17" x 17" x 7" (19" rack mounting)

Volume: 2023 cubic inches

Meets MIL shock, vibration and humidity specifications

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(213) 772-5201 / TWX: 213-647-5161

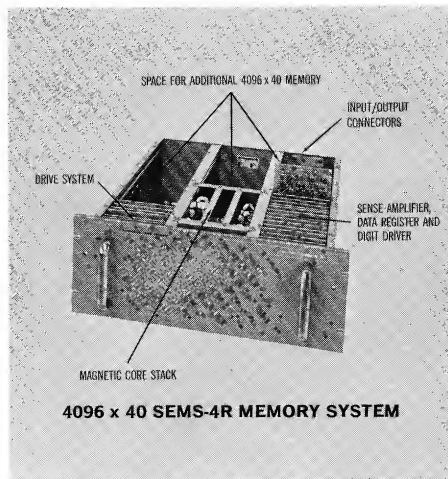
THE SEMS-4R

Volume: 2023 cubic inches

Capacity: 8192 words of 40 bits

Speed: Access time 1.0 μ sec; 220,000 random memory cycles per second; cycle time 4.0 μ sec

Environments: MIL-Q-9858, MIL-E-16400E, MIL-E-4158B, MIL-STD-810 for GSE



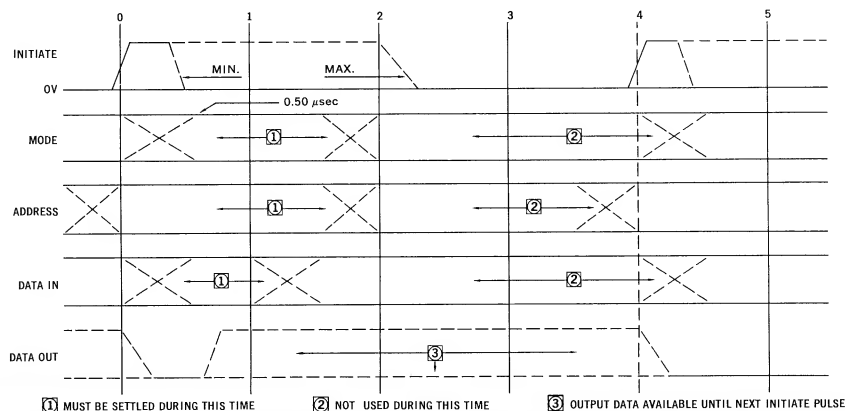
4096 x 40 SEMS-4R MEMORY SYSTEM

The SEMS-4R is a low cost, rack mounted, printed circuit memory providing high reliability in severe environments. A wide range of word capacities and bit sizes is available. The SEMS-4R may be obtained in three operating temperature ranges.

The memory system offers two functional options: sequential count and sequential interlace. Hardware options are rack mounting slides and power supply. The SEMS-4R is also available with a self-testing option. Special options to meet specific customer requirements can be arranged.

The SEMS-4R is designed for shipboard, mobile and ground-based military, industrial and commercial uses where speed, reliability and mobility are required design criteria.

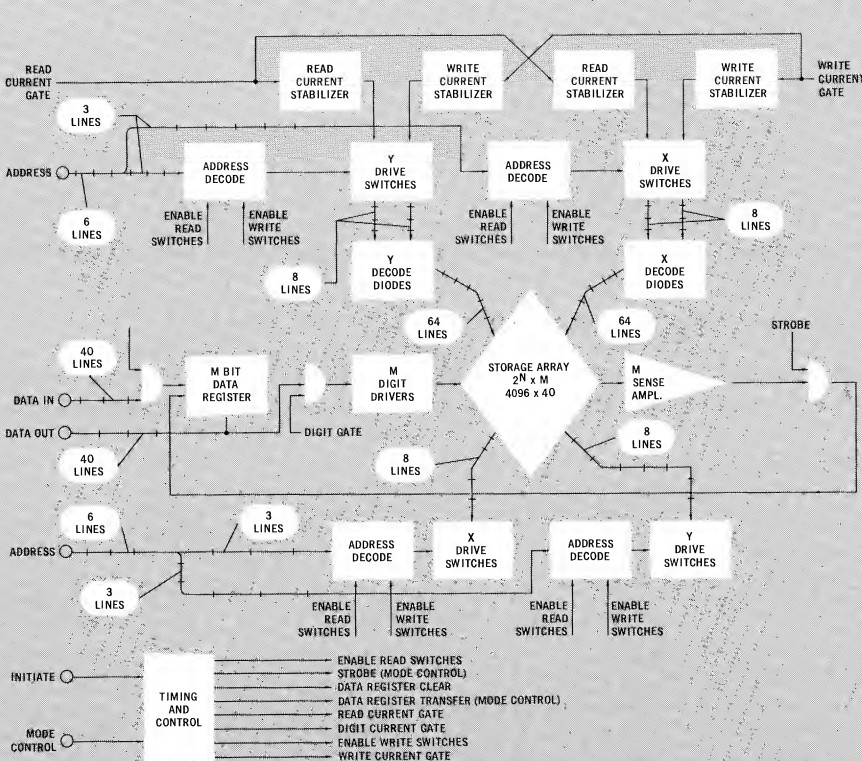
TIME IN MICROSECONDS



SPECIFICATIONS

Storage Capacity	256, 512, 1024, 2048, 4096 or 8192 words of 6 to 40 bits
Operating Temperature	−40°C to +85°C −20°C to +65°C 0°C to +50°C
Storage Temperature	−62°C to +100°C
Altitude	50,000 ft.
Read/Restore Cycle Time	4.0 μ sec
Clear/Write Cycle Time	4.0 μ sec
Access Time	1.0 μ sec
Operating Rate	0 to 250 KC
Input Signal Levels	Binary 0 = 0V to 0.5V Binary 1 = +4V to +7V
Output Signal Levels	Binary 0 = 0V to 0.25V Binary 1 = +5V to +6.5V

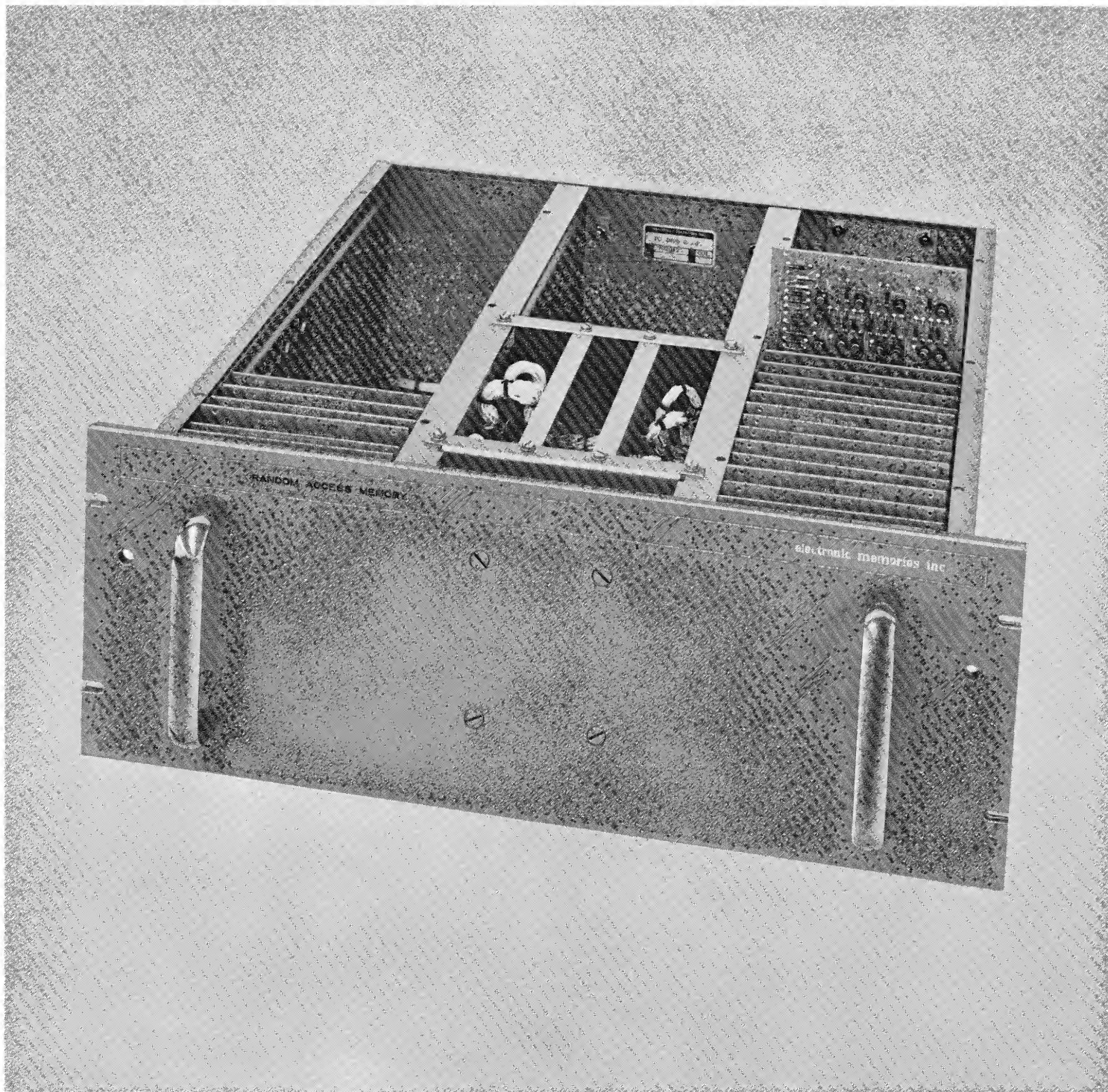
Input Currents	
A. Address	3 ma. max. for 1.5 μ sec if line is in + state; 0 ma. if line is in 0 state
B. Mode Control	0.4 ma. in 0 state (CLEAR/WRITE), 0 ma. when in + state (READ/RESTORE)
C. Information	0 level — no current required + level — less than 1.0 ma.
D. Initiate	0 level — no current required + level — less than 1.0 ma.
E. Edge Current	In addition to the logic current required, approximately 9.0 ma. of edge current must be supplied to charge a capacity of approximately 200 μ f to effect a change from one logic level to another level within 100 nanoseconds
Output Current Information Lines	0 level — 0 current + level — +5 ma.



Input Signal Characteristics	Rise Time (μ Sec)	Width (μ Sec)
A. Address	.1	1.5 min.
B. Initiate	.1	0.2 to 2.0
C. Information Lines	.1	1.0 min.
D. Mode Control	level	level

Output Signal Characteristics		
Information	.1	2.0 min.

Power Requirement (4096 x 40)	55w at 4.0 μ sec cycle time
Voltages Required	+15, +6, −3
Volume (8192 x 40)	2023 cubic inches
Weight (8192 x 40)	40 lbs.
Form Factor (8192 x 40)	17" x 17" x 7" (19" rack mounting)
Applicable Mil Specs	MIL-E-16400E, MIL-E-4158B, MIL-Q-9858
Vibration and Shock	MIL-STD-810 for GSE
Packaging	Encapsulated magnetics for severe environments Standard commercial magnetics for commercial environments



SEMS-4R CORE MEMORY SYSTEM

Capacity: 256 to 8192 words
6 to 40 bits per word

Speed: 4 μ sec cycle time, 1 μ sec access time

Operating Temperature Ranges: -40°C to +85°C
-20°C to +65°C
0°C to +50°C

Size: 17" x 17" x 7" (19" rack mounting)

Volume: 2023 cubic inches

Meets MIL shock, vibration and humidity specifications

electronic memories inc.

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THE SEMS-4R

Volume: 2023 cubic inches

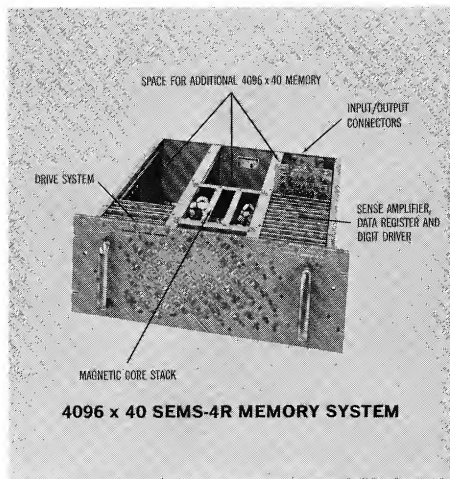
Capacity: 8192 words of 40 bits

Speed: Access time 1.0 μ sec; 220,000 random memory cycles per second; cycle time 4.0 μ sec

Environments: MIL-Q-9858, MIL-E-16400E, MIL-E-4158B, MIL-STD-810 for GSE

The SEMS-4R is a low cost, rack mounted, printed circuit memory providing high reliability in severe environments. A wide range of word capacities and bit sizes is available. The SEMS-4R may be obtained in three operating temperature ranges.

The memory system offers two functional options: sequential count and sequential interface. Hardware options are rack mounting slides and power supply. The SEMS-4R is also available with a self-testing option. Special options to meet specific customer requirements can be arranged.



4096 x 40 SEMS-4R MEMORY SYSTEM

The SEMS-4R is designed for shipboard, mobile and ground-based military, industrial and commercial uses where speed, reliability and mobility are required design criteria.

SPECIFICATIONS

Storage Capacity 256, 512, 1024, 2048, 4096 or 8192 words of 6 to 40 bits

Operating Temperature -40°C to +85°C
-20°C to +65°C
0°C to +50°C

Storage Temperature -62°C to +100°C

Altitude 50,000 ft.

Read/Restore Cycle Time 4.0 μ sec

Clear/Write Cycle Time 4.0 μ sec

Access Time 1.0 μ sec

Operating Rate 0 to 250 KC

Input Signal Levels Binary 0 = 0V to 0.5V
Binary 1 = +4V to +7V

Output Signal Levels Binary 0 = 0V to 0.25V
Binary 1 = +5V to +6.5V

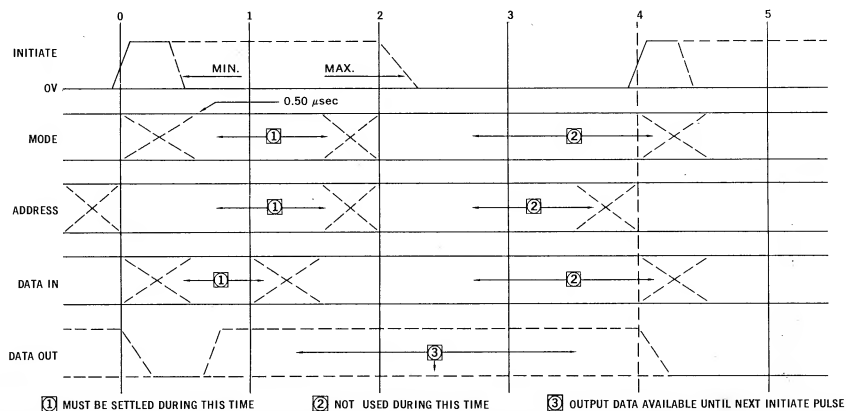
Input Currents

- A. Address 3 ma. max. for 1.5 μ sec if line is in + state; 0 ma. if line is in 0 state
- B. Mode Control 0.4 ma. in 0 state (CLEAR/WRITE), 0 ma. when in + state (READ/RESTORE)
- C. Information 0 level — no current required
+ level — less than 1.0 ma.
- D. Initiate 0 level — no current required
+ level — less than 1.0 ma.
- E. Edge Current In addition to the logic current required, approximately 9.0 ma. of edge current must be supplied to charge a capacity of approximately 200 μ f to effect a change from one logic level to another level within 100 nanoseconds

Output Current Information Lines

0 level — 0 current
+ level — +5 ma.

TIME IN MICROSECONDS



Input Signal Characteristics

	Rise Time (μ sec)	Width (μ sec)
A. Address	.1	1.5 min.
B. Initiate	.1	0.2 to 2.0
C. Information Lines	.1	1.0 min.
D. Mode Control	level	level

Output Signal Characteristics

Information	.1	2.0 min.
-------------	----	----------

Power Requirement (4096 x 40) 55w at 4.0 μ sec cycle time

Voltages Required +15, +6, -3

Volume (8192 x 40) 2023 cubic inches

Weight (8192 x 40) 40 lbs.

Form Factor (8192 x 40) 17" x 17" x 7" (19" rack mounting)

Applicable Mil Specs MIL-E-16400E, MIL-E-4158B, MIL-Q-9858

Vibration and Shock MIL-STD-810 for GSE

Packaging

Encapsulated magnetics for severe environments
Standard commercial magnetics for commercial environments

